Activity:

1. Go into the lab, get a tall bulb, a screen with a hole in it and a piece of paper.

Shine the light through the pinhole and measure:
h_o - size of the object - the filament of the bulb
h_i - size of the image on the piece of paper
d_o - distance from the object to the optical device (pinhole).
d_i - distance to the piece of paper from the pinhole.

Derive an equation relating the variables.

Draw a ray diagram - re-derive the equation.

2. Look in various mirrors and write your observations:

a) plane mirror - flat. Predict the smallest mirror that will show your whole body.
b) convex mirror- bulges out - used for sideview mirrors of the car, shoplifting or corners.
c) concave mirror - used for telescopes, dentists

Observations:

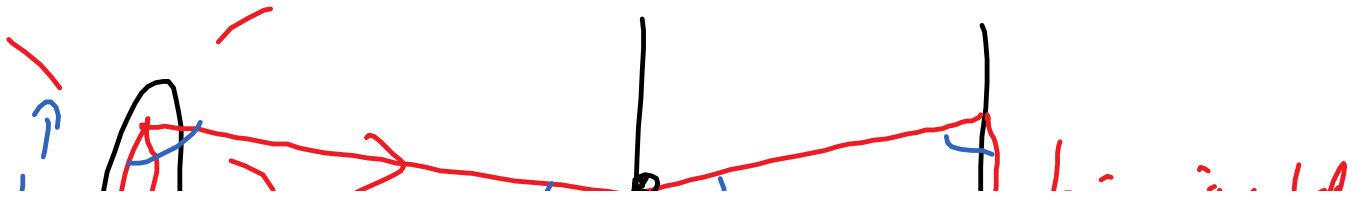
Pinhole:
We saw an image of the filament on the screen. The size of the image, hi, increased when you increased di and ho. hi decreased when you increased do.
hi/ho= -di/do the image was inverted - you cover the top of the light bulb and the bottom of the image is covered.

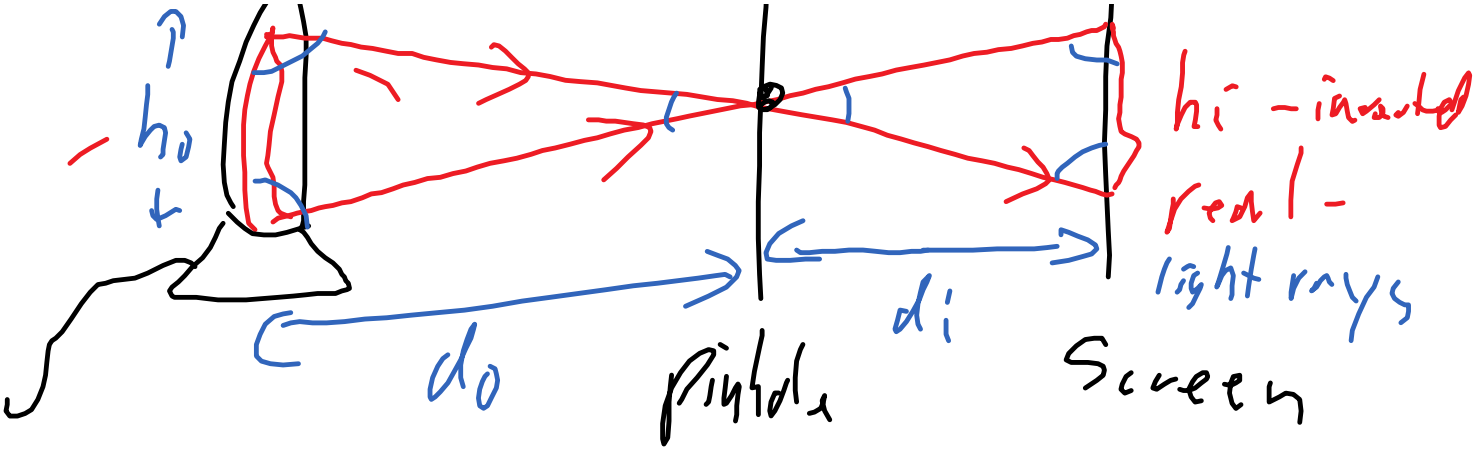
The ratio of the size of the image to the object is called the linear magnification,

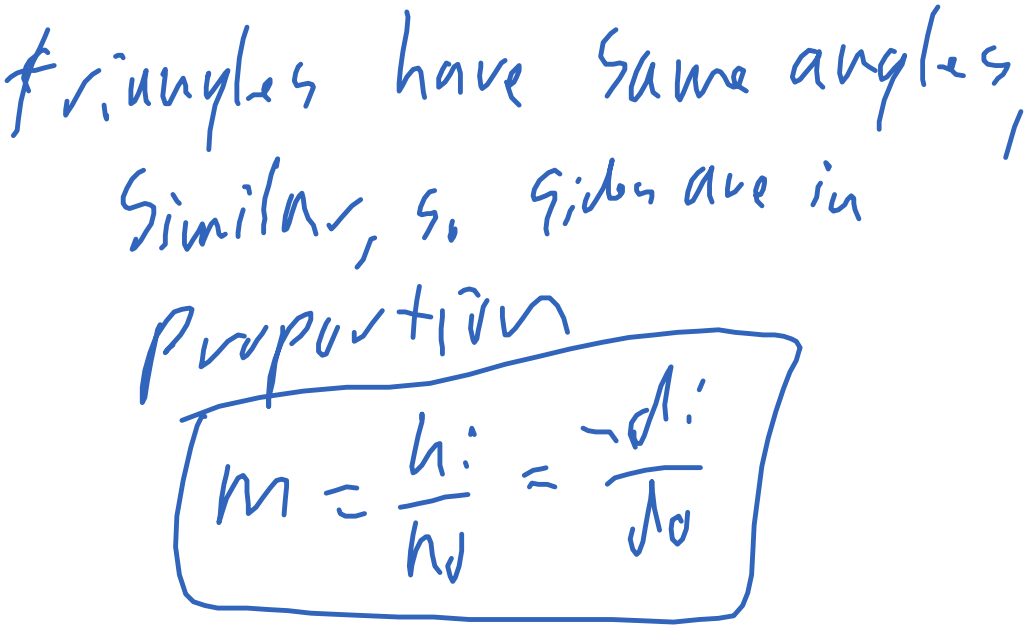
m=hi/ho= -di/do

we will use this equation for mirrors and lenses as well as the pinhole.

we can also derive this equation geometrically







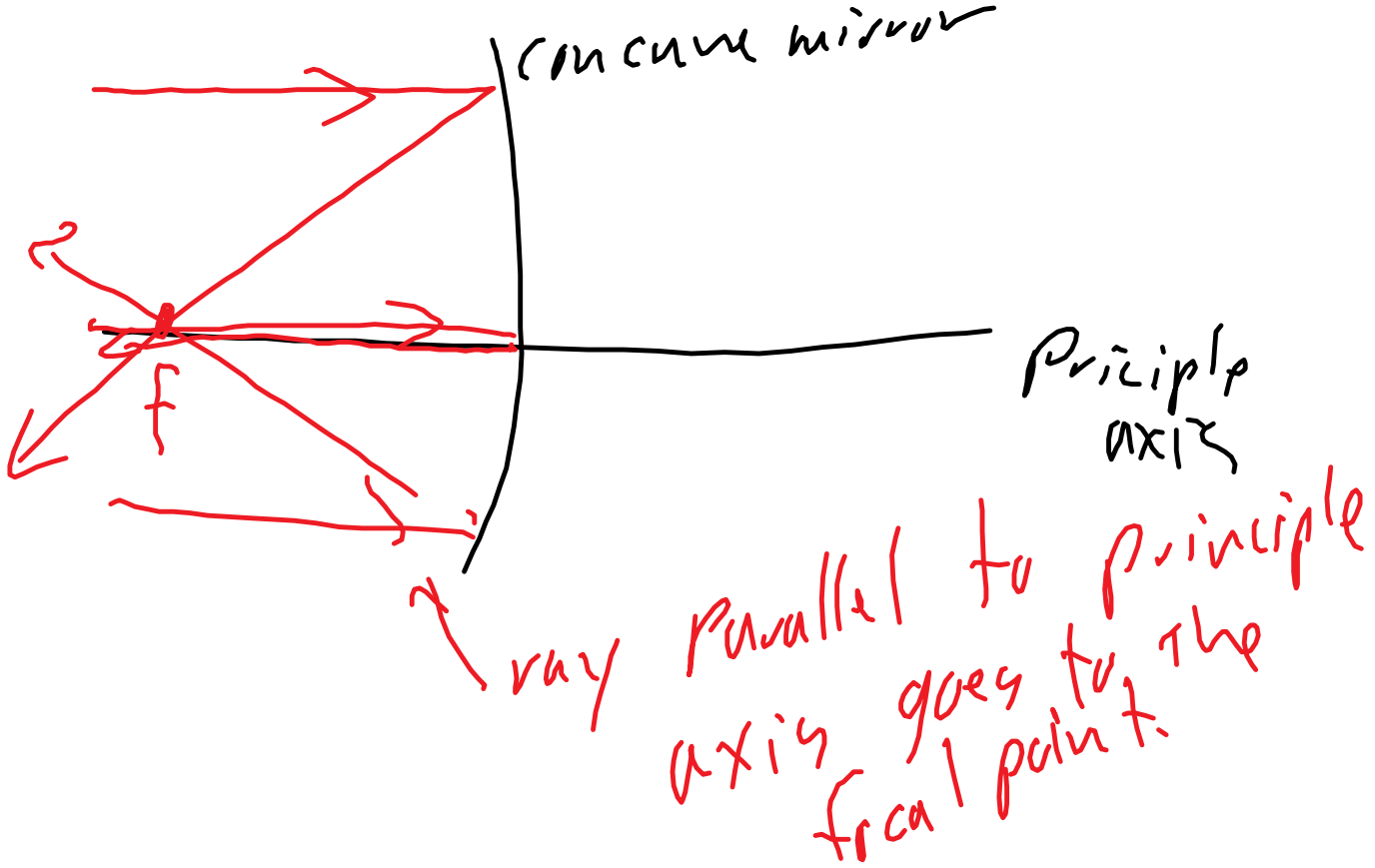
What did you observe with the mirrors?

concave mirror - the image is bigger and upright if you are close, upside down if you are far. You can make an image on the screen with it if the object is farther than the focal point.

convex mirror - the image is smaller and upright. No image on the screen.

focal point, f - point where light parallel to the principle axis reflects to (concave mirror) or away from (convex mirror).

Principle axis is the line down the centre perpendicular to the surface.



read Ch 18.1 and try Q1-4 p374